

CLAIMS**We Claim:**

1. A gas burner comprising:
 - a) a burner body including:
 - i) a lower housing;
 - ii) an element defining a combustion surface attached to said lower housing;
 - iii) a diffuser/reflector positioned below said element;
 - b) an inlet conduit communicating with said burner body through which a gas/air mixture is delivered to said burner body in a region located below said diffuser/reflector; and,
 - c) said diffuser/reflector including a plurality of openings, each opening having an overhanging guide plate.
2. The burner of claim 1 wherein said diffuser/reflector has a somewhat inverted V-shaped configuration.
3. The burner of claim 2 wherein said openings are arranged in sets of parallel rows and said diffuser/reflector includes a second plurality of openings located in an upper region of said diffuser/reflector which do not include associated guide plates.
4. The burner of claim 3 wherein said diffuser/reflector is a sheet metal stamping, and said guide plates are formed by partially stamping through the sheet metal in order to form outwardly extending elements that define the associated overhanging guide plates.
5. A gas burner comprising:
 - a) a burner body including:
 - i) a lower housing;
 - ii) an element defining a combustion surface attached to said lower housing;
 - b) an inlet conduit communicating with said burner body through which a gas/air

mixture is delivered to said burner body in a region located below said combustion surface defining element; and,

c) said combustion surface defining element being radiused and including a plurality of integrally formed rigidizing ribs.

6. The burner of claim 5 wherein said lower housing includes integrally formed flanges adapted to receive longitudinal edges of said combustion surface defining element by which said combustion surface element is secured, at least partially, to said lower housing.

7. The burner of claim 6 wherein said flanges are oriented in a tangential relationship with respect to said combustion surface defining element.

8. The burner of claim 7 wherein said lower housing comprises a channel member having upwardly directed sides, said flanges being defined at upper edges of said sides and said lower housing further includes a pair of endcaps secured to opposite ends of said channel member.

9. The burner of claim 8 wherein said endcaps include arcuate flanges for receiving and securing side edges of said combustion surface defining element.

10. The burner of claim 8 wherein one of said endcaps includes an aperture through which said inlet conduit extends, said endcap being captured between a pair of upset ridges formed on said inlet tube, whereby said inlet tube is secured to said burner body.

11. The burner of claim 1 wherein said inlet conduit includes a segment that extends into an interior region of said burner body and has a discharge end that is cut on an angle.

12. The burner of claim 11 wherein said angle is substantially 45°.

13. The burner of claim 1 wherein said burner body is substantially rectangular in shape.

14. The gas burner of claim 5 wherein said combustion surface defining element comprises a screen made from a high temperature steel alloy wire cloth having a twill weave of 30x32 mesh.

15. A gas burner for use in a water heater, said water heater including a wall at least partially defining a combustion chamber and an access opening in said wall, comprising:

- a) a burner body including a lower housing and an element defining a combustion surface that is attached to said lower housing;
- b) an inlet conduit communicating with said burner body through which a gas/air mixture is delivered to said burner body in a region located below said combustion surface defining element; and,
- c) an access door for closing off said access opening when said burner is in its installed position within said water heater, said access door secured to an inlet end of said inlet conduit;
- d) said inlet end of said inlet conduit including an upset ridge that abuts an inside surface surrounding an opening in said door through which said inlet conduit extends and an outwardly extending flare that abutably engages an outside surface of said door, whereby said door is secured to said inlet conduit.

16. The burner of claim 10 wherein said one endcap includes an axial flange around said aperture that is captured between said pair of upset ridges formed on said inlet tube.

17. The gas burner of claim 15 further including mounting structure attached to said door for mounting a gas orifice a spaced distance from said inlet end of said inlet conduit.

18. The gas burner of claim 17 wherein said inlet end of said inlet conduit is secured to said door in a door region having a predetermined profile that is unrelated to the radius of said access opening.

19. The gas burner of claim 15 wherein said inlet conduit is secured to an endcap portion forming part of said burner body, said inlet conduit including a pair of upset ridges located on either side of a wall forming part of said endcap portion.

20. A diffuser/reflector for use in a gas burner of the type that includes a burner body and a screen element attached to said burner body that defines a combustion surface and an inlet conduit for delivering a gas/air mixture to a region below said screen element, said diffuser/reflector comprising a structure including a plurality of openings, each opening of said plurality including a transversely extending overhanging element, said elements being arranged to reflect heat away from said lower housing and to encourage gas/air mixing as said gas/air mixture travels from said lower housing to said combustion surface..

21. The diffuser/reflector of claim 20 wherein said structure is generally arcuate.

22. The diffuser/reflector of claim 20 further including another plurality of openings located in an another region of said structure, said other plurality of openings forming part of an unobstructed flow path for said gas/air mixture to said combustion surface.

23. The diffuser/reflector of claim 20 wherein said structure includes a non-apertured section that is positioned in said gas burner, such that it is located in a region of said gas burner that is remote from an inlet end of said gas burner.

24. The diffuser/reflector of claim 20 wherein said structure is rectangular in shape when viewed in plan and is intended to fit within a rectangularly shaped burner housing.

25. The diffuser/reflector of claim 20 wherein said openings and overhanging elements are arranged, such that they form a stair cased profile.

26. The diffuser/reflector of claim 20 wherein said structure is inverted V-shaped.

27. A gas burner for use in a water heater, said water heater including a wall at least partially defining a combustion chamber and an access opening in said wall, comprising:

- a) a burner body including a lower housing and an element defining a combustion surface that is attached to said lower housing;
- b) an inlet conduit communicating with said burner body through which a gas/air mixture is delivered to said burner body in a region located below said combustion surface defining element; and,
- c) a bulkhead/access door for closing off said access opening when said burner is in its installed position within said water heater, said bulkhead/access door secured to an inlet end of said inlet conduit;
- d) said inlet end of said inlet conduit being secured to said bulkhead/access door in a region defining a mounting location having a predetermined profile that is unrelated to the radius of said access opening.

28. The gas burner of claim 27 wherein said inlet end of said inlet conduit includes an upset ridge that abuts an inside surface of mounting location region and an outwardly extending flare that abuttably engages an outside surface of said region whereby said bulkhead/access door is secured to said inlet conduit.

29. The gas burner of claim 27 further including mounting structure attached to said mounting location, said mounting structure supporting a gas orifice a spaced distance from said inlet end of said inlet conduit.

30. The gas burner of claim 29 wherein said mounting structure includes a rodent shield.

31. The gas burner of claim 29 wherein said mounting structure comprises an element having a plurality of legs, said legs extending from a seat, distal ends of said legs being secured to said region defining a mounting location on said bulkhead/access door, at spaced locations.

32. The gas burner of claim 31 wherein said element further includes a deflecting tab which facilitates the assembly of a water heater that utilizes said gas burner.

33. The gas burner of claim 27 wherein said combustion chamber includes at least one port through which secondary combustion air is admitted into said combustion chamber.

34. A gas fired heating apparatus, comprising:

- a) structure defining a combustion chamber;
- b) a flue passage communicating with said combustion chamber through which products of combustion are exhausted;
- c) a gas burner located within said combustion chamber, said gas burner including an inlet conduit through which combustible gas and primary air are communicated to said burner; and,
- d) an air scoop shrouding said inlet conduit and at least partially defining a flow path of primary air, substantially isolated from said combustion chamber and which extends from an inlet end of said inlet conduit to a primary air port that communicates with a source of primary air located outside said combustion chamber.

35. The heating apparatus of claim 34 wherein said combustion chamber further includes at least one port through which secondary combustion air is admitted into said combustion chamber.

36. The heating apparatus of claim 34 wherein said structure defines an opening through which said burner is installed into said combustion chamber and said heating apparatus further includes a flow path transition member located within said combustion chamber and in fluid communication with said primary air port, said transition member forming part of said isolated primary air flow path and sealingly engageable with said air scoop when said burner is positioned in said combustion chamber.

37. The apparatus of claim 36 wherein said sealing engagement between said air scoop and transition member is provided by at least one flange formed on said transition member and engaged by complementally shaped structure defined by said air scoop as said burner is moved into its operative position through said opening.

38. The heating apparatus of claim 34 wherein said structure forms part of a water heater.

39. The apparatus of claim 38 further including a door for closing off said opening after installation of said burner, said door adapted to mount a gas orifice through which combustible gas is discharged within said air scoop.

40. The apparatus of claim 39 wherein a portion of said air scoop is secured to said inlet conduit by capturing a portion of said air scoop between upset ridges formed on said inlet tube.

41. The apparatus of claim 40 further including a gasket for concurrently sealing said door and said gasket forming a portion of a seal between said transition member and said air scoop.

42. The heating apparatus of claim 36 wherein said transition member is mounted to a

base plate of said water heater and overlies a port communicating with a region below said water heater which serves as a source of primary air.

43. The heating apparatus of claim 42 wherein said air scoop includes a lip extending outwardly along a lower edge which is engageable with a complementally shaped flange on said transition member, said lip engaging said flange as said burner is moved into its installed position within said combustion chamber.

44. The apparatus of claim 36 wherein said air scoop is secured to said bulkhead/access door in a region defining a mounting location on said bulkhead/access door, said region having a predetermined profile that is unrelated to the radius of said access opening.

45. A gas burner for use in a water heater, said water heater including a wall at least partially defining a combustion chamber and an access opening in said wall, comprising:

- a) a burner body including a lower housing and an element defining a combustion surface that is attached to said lower housing;
- b) an inlet conduit communicating with said burner body through which a gas/air mixture is delivered to said burner body in a region located below said combustion surface defining element;
- c) a bulkhead/access door for closing off said access opening when said burner is in its installed position within said water heater; and,
- d) an air scoop shrouding said inlet conduit and at least partially defining a flow path of primary air, substantially isolated from said combustion chamber and which extends from an inlet end of said inlet conduit to a primary air port that communicates with a source of primary air located outside said combustion chamber, said bulkhead/access door secured to said air scoop;
- e) said air scoop being secured to said bulkhead/access door in a region defining a mounting location on said bulkhead/access door, said region having a predetermined profile that

is unrelated to the radius of said opening.